EXHIBIT "A"

OR169quar09_30_99.txt

QUARTERLY PROGRESS REPORT FOR JUL-SEP 1999

PROJECT TITLE: Microchip Mass Spectrometer

LAB/CONTRACTOR: ORNL

DOE:HQ PROJECT NUMBER: OR-169

DATE: September 30, 1999

PRINCIPAL INVESTIGATOR(S):
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HQ PROJECT MANAGER: Michael O'Connell

PROGRESS DURING QUARTER:

Last quarter, an array of diamond-coated silicon whiskers was demonstrated to be a potentially useful cold cathode source of electrons for sample ionization in a micro ion trap mass spectrometer. The array was nominally 2 mm in diameter while the trap used in the experiments had a diameter of 1 mm with endcap apertures of 0.45 mm. To increase the number of trapped ions and therefore the sensitivity, we explored the use of a two-dimensional array of traps, in this case, seven 1-mm traps in a circular pattern. The whisker array was large enough to overlap with the central apertures of the seven traps so that ions could be generated in them all. The array was tested by measuring the mass spectrum of xenon isotopes again and a substantially larger signal was obtained than from a single trap. Mass resolution was nearly as good as for the single trap, indicating that the dimensions of the traps were the same to 0.1%.

TECHNICAL REPORTS AND PRESENTATIONS:

O. Kornienko, P. T. A. Reilly, W. B. Whitten, and J. M. Ramsey, "Electron impact ionization in a micro ion trap mass spectrometer" Rev. Sci. Instrumen. 70, 3907-3909 (1999).

O. Kornienko, P. T. A. Reilly, W. B. Whitten, and J. M. Ramsey, "Field emission cold cathode EI source for a micro ion trap mass spectrometer", submitted to Analytical Chemistry.